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# The füzesabony-gubakút settlement development model of the alföld linear pottery culture in the light of the recent archaeological discoveries at hejőpapi-szeméttelep (2008-2011) and bükkábrány-bánya vii -vasúti dűlő (2009-2011)

## Abstract

Thanks to the extensive excavations that have been going on since the mid 1990s, archaeological research has managed to gain a greater insight into the settlement history of the ALPC. The large linear settlements and neatly arranged house-pit-grave ensembles offered an excellent opportunity to examine the relative and absolute chronology of the settlements and to gain an understanding of the settlements' internal development mechanism. The ALPC settlement development model on micro, mezo and macro scales was based on our key site of Füzesabony-Gubakút and its microregion in the southern Heves area. The most recent excavation results from Hejőpapi-Szeméttelep and Bükkábrány-Bánya VII -Vasúti dűlő in the Borsod area should be considered excellent test data for our model, as these sites were excavated in almost their entirety. As the processing of the finds from these excavations is still to come, the test in question is only really relevant for the structure of the settlement. Even so it is possible to draw serious conclusions from the data we already have.

**Keywords:** excavation, chronology, carpathian basin, neolithic settlements, körös culture

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## Preface

Scholarly views of the Alföld Linear Pottery Culture (ALPC) period have undergone enormous changes over the past 20 years. The conclusions that had been made in the 1960s, which had subsequently enjoyed a wide consensus, have had to confront their first serious revisions concerning the settlement structures. Up until the late 1980s, researchers believed that during the course of the ALPC period in the eastern half of the Carpathian Basin people lived in pit dwellings and in small settlements. Their data had for the most part been gathered from small-scale excavations, which meant that the reliability of the data available was well below the level considered acceptable today.[1–6] In hindsight one can say that the picture the scholars had of the neolithic settlements in question had been made up from tiny mosaic-like fragments and it was no wonder therefore that it was impossible to form an accurate picture of what they looked like. Furthermore, the archaeological techniques used at the time had barely changed in 30-40 years. The small quantity of data collected and the quality of this data, restricted academic debate to typological and chronological issues. The majority of such articles focused on ceramic finds, while research into the economy and the society of the time, or any attempts at understanding the more complex interrelationships existing within people's lives, were beyond the realistic capabilities of the discipline at the time. The origins of the analytical systems used during the course of such archaeological investigations dated back to the 1950s, the 1960s and indeed further and were based primarily on the diffusion and autochthon development models associated with O. Montelius and then VG Childe[7] in which it was either the local indigenous populations or the migratory settlers who were considered of central importance in the neolithization process.[7] One has to admit that the lack of data available allowed considerable leeway in the formation of individual opinions which meant one was always at the mercy of individual preconceptions. From the middle of the last century, due partly to the lack of data available and partly to the dominant ideology of the time (for the most part based on communistic principles, albeit set within the constraints of the nation state), there was a tendency in Central Europe for each localized study to claim the overriding importance of its own finds while at the same time putting forward an argument for a theory of neolithization in which the autonomous developments going on in the region concerned took precedence over any developments going on elsewhere. One needs to look no further than the terminology used to describe the geographical extents of such neolithic cultures, which hinder rather than help any attempt at understanding the processes that were actually at work. The ALPC came under a different name depending on whether one happened to be in eastern Hungary, eastern Slovakia or northern Transylvania and for each different term there was a slightly different set of defining characteristics.[1,8–10] In keeping with the consensus of the time the local Mesolithic population was given a central role in the emergence of this new culture too. In Hungary the ALPC was considered the legacy of that mesolithic ethnic group which, in contrast with the developed southern settlers of the Körös Culture, hung onto the territories of the Upper Tisza and only became neolithized gradually over a period of many centuries. It was seen to be a distinctive culture, considered slightly backward compared with that of the Körös Culture and one in which the mesolithic traditions (e.g. the pit dwellings) survived for a

much longer time: remaining beyond the late groups of the ALPC and into the Tisza Culture as well.[11]

From the mid 1990s, in eastern Hungary, thanks to the extensive archaeological activity going on prior to major motorway construction in the region, new settlement structures started to come to light in their entirety. The new findings challenged what we knew about ALPC settlements up to that point and the interpretations associated with them. Post-framed house remains and large linear settlements were found and complete settlement parts uncovered, which shed light on several centuries of settlement history, while the finds themselves - upon which just about every means of analysis was undertaken - saw the organic finds assuming an ever greater importance alongside the ceramic remains. The scientific examination of the former provided data that was unusually important in supplying answers not only to the chronological issues, but in opening up the way to an understanding of economic and social relationships. It is not surprising that the first publications following the extensive excavations revealed a yawning gap in the middle of previous interpretations. Initially, in the middle of the 1990s, it was still only the reception of recent findings on settlement structures that sparked debate within the profession. A significant number of daub remains from walled houses built at ground level were found at Mezőkövesd-Mocsolyás,[12] the groundplans of post-framed houses were found in Polgár-Kengyel-köz[13] and then at Füzesabony-Gubakút,[4,14] where house-grave-pit ensembles were found in a such a regular arrangement, that it was possible to interpret them as being linear settlements. Such a layout betrayed a great similarity with the settlement structures of the Körös and Tisza Cultures, challenging the earlier view that the ALPC period was a regressive rather than a transitional phase.[15,16]

Later, as a result of the analysis of the new excavation finds, other theories based on earlier data also fell, this time in domino fashion. From the bone material, analysed both from an anthropological and a zoological point of view, it was possible to assume that a closer relationship existed with the Körös Culture than had been previously thought, which in turn demanded a new, more detailed examination of the Körös - ALPC transition.[17] The acquisition of ever greater C14 data made it possible to break down the sites into settlement history phases - with the Füzesabony-Gubakút site assuming central importance - while at the same time offering a more precise definition of the Szatmár Group, which geographically-speaking covered the Upper Tisza region and the territories of the Alföld to the north of it. All this demanded a new account of the neolithization of the eastern half of the Carpathian Basin, this time assuming that the process took place within the sphere of the Körös Culture ethnic group and with only a relatively small amount of local assimilation. While theoretically we assumed that the Szatmár Group developed upon the heritage of the Körös Culture, the lack of northern Körös Culture sites, together with the narrow overlapping of the extents of the Körös Culture and the Szatmár Group, meant there was an insurmountable obstacle in the way of this new theory.

Moving into the new millennium the earlier interpretations had been compromised to such an extent that almost everything had been brought into question. As a result of this, from a theoretical standpoint at least, it appeared most logical to start looking for Körös sites in the Central Tisza region, to the north of the Kunhegyes-Berettyóújfalu line which had once been considered to be a border region. During the course of the field surveys it was only a matter of days before several potential sites had been found, there were only two, however, one at Tiszaszőlős-Domaháza 50 km north of Szolnok and Ibrány-Nagyerdő 20 km east of Tokaj, where it was possible to prove with excavations the existence of northern Körös Culture sites.[18,19] Thus the decision to call earlier theories into question and go in search of places, which due to the prevailing beliefs had not been done for almost 50 years, proved justified.[20,21] Today, the northern extent of the Körös Culture is held to be the Upper Tisza and its smaller northern tributaries, proving from a geographical point of view that the Körös Culture had preceded the Szatmár Group and should therefore be considered its immediate local predecessor and its most plausible ethnic forerunner. At the same time, however, the data relating to the local indigenous population is scarce. Those finds considered to be mesolithic hardly appear at all in a mixed context. It is for this reasons that one can conclude that the indigenous mesolithic population merged almost imperceptibly into the neolithic community during the course of what was a very slow transition. This process may have lasted from the period of the Körös Culture to the end of the ALPC, the most concentrated period probably being during the late ALPC in the hilly areas as suggested in the anthropological data. Today the ALPC can be seen as an organic transition between the Körös Culture and the Tisza Culture, in a continuous cultural development. Initially the process was based on the Körös population that in time absorbed even larger proportion of northern people of mesolithic background.[22,23] This important period and developmental phase covers the second half of the 6th millennium BC, which coincided with the appearance of neolithic modes of living in the Carpathian Basin, their gradual expansion and a golden age characterised by tell cultures.

Attitudes towards the internal development of the ALPC have also changed significantly. One can safely say that today we are currently going through a kind of paradigm change in the analysis of the ALPC. Indeed, we have reached a point where new excavation data and the resulting analyses are putting such pressure on the previously accepted beliefs that the theoretical scheme by which the ALPC was once understood is in danger of being dismantled altogether. The new excavation observations and finds, combined with the results of the scientific research, supply us with an ever more extensive picture of everyday life, which has pushed our frontiers of knowledge to such an extent that there is now a real demand within the discipline for a complex, comprehensive historical reconstruction of many aspects of life.[6,24]

## The new alpc settlement history model

Thanks to the extensive excavations that have been going on since the mid 1990s, archaeological research has managed to gain a greater insight into the settlement history of the ALPC. The large linear settlements and neatly arranged house-pit-grave ensembles offered an excellent opportunity to examine the relative and absolute chronology of the settlements and to gain an understanding of the settlements' internal development mechanism. The ALPC settlement development model was based on our key site of Füzesabony-Gubakút and its microregion in the southern Heves area.[6]

At Gubakút we found the ground plans of a number of houses, which suggested 12-16 x 5-6 m triple-partitioned buildings, of the kind that were already in existence in the earliest ALPC period. The houses were arranged in rows along the two banks of the stream then running there. Between the houses there were pits and around the corner of the houses we found evidence of buried human remains. It gave the impression of a settlement that had been both planned and organized (Figure 1).

**Citation:** Domboróczki L, Kalli A, Makoldi M, et al. The füzesabony-gubakút settlement development model of the alföld linear pottery culture in the light of the recent archaeological discoveries at hejőpapi-szeméttelep (2008-2011) and bükkábrány-bánya vii -vasúti dűlő (2009-2011). *J His Arch & Anthropol Sci.* 2017;2(2):31–43. DOI: 10.15406/jhaas.2017.02.00046

 

**Figure 1** The excavation area with the Neolithic features at Füzesabony-Gubakút (with pits /green/, house plans /blue/ and graves /red/).

## The site model

The site model was based on the C14 chronology of the house-pit-grave ensembles and verified with restoration data, stratigraphical evidence and ceramic seriation.[6] Initially, following a rigorous analysis of the radiocarbon dates, we managed to define a 12-phase chronological system, in which the length of the individual phases was shortened to an average of 30-50 years. Interestingly enough the dates of the graves fit well chronologically with the closest of the neighbouring pits and when treated as pairs they belong to the same sub-phases. As there is always evidence of post-framed houses in the area between the graves and the pits, the grave-pit-house ensembles could be identified on a phase-by-phase basis as the remains of the household units (Figure 2).

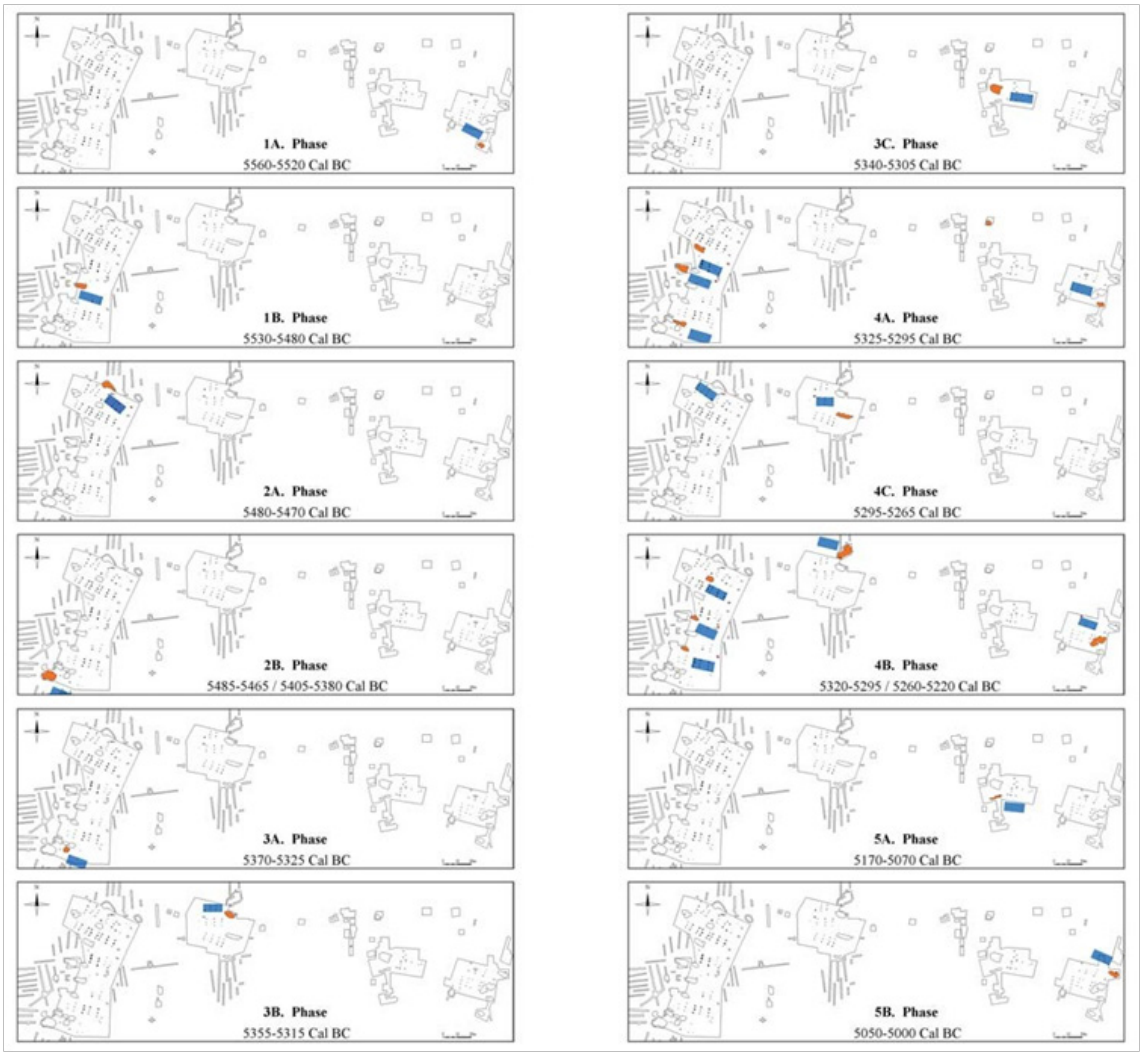


**Figure 2** Spatial pattern of the 5 phase, 12 subphase chronological scheme at Füzesabony-Gubakút.

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From the considerable amount of C14 data gained it emerged, that during the 340-year history of the Gubakút settlement, between 5560-5220 BC, only a few houses (and pits) stood on the site at any one time and that the linear settlement structure was the result of a long period of development following strict traditions. By using surface collection finds it was possible to apply the data from the excavation to the whole settlement area (Figure 3).

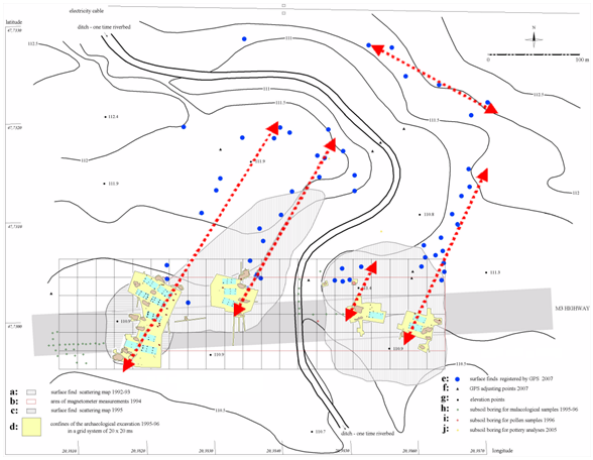

**Figure 3** The real dimensions of the Neolithic settlement at Füzesabony-Gubakút.

a. Mapped dispersion of surface finds in 1992-93,
b. Area of magnetometer survey in 1994,
c. Mapped dispersion of surface finds in 1995,
d. Areas of the archaeological excavation in 1995-96 within a grid system of 20x20 m,
e. Surface finds registered by GPS in 2007,
f. GPS adjusting points in 2007,
g. Elevation points,
h. Subsoil borings for malacological samples in 1995-96,
i. Subsoil borings for pollen samples in 1996,
j. Subsoil borings for pottery composition analysis in 2005.

By taking into consideration the settlement dynamic within the excavated area (the increase in the number of dwellings) it was possible to calculate the number of houses in existence at any one time[6] (Table 1). With such data at our disposal we can now think in terms of compiling whole settlement histories based on house generations. With the help of a certain amount of imagination we even tried to outline the demographic situation and see settlement development in terms of a history of lineage. According to such a model the settlement was founded by a small family of 5-6 people in around 5500 BC and by virtue of an almost constant settlement dynamic, reached its peak 300 years later with 14 houses standing simultaneously and with a total population of 70-84 people. Shortly afterwards however the settlement became depopulated. The disappearance of the settlement network can probably be traced back to drastic change going on within the region as a whole rather than any more localized reasons. Violent attack or a migration from the region caused by climatic change is both imaginable scenarios. As we managed to detect a relationship between the refuse pits, the post-framed buildings and the nearby graves when establishing the phases in the settlement history, we were able to look at our data in terms of family units and individual households. Indeed we went even further and analysed the pit finds in terms of the accumulated refuse of single households. For the most part the domestic objects and other items associated with everyday life correlated nicely with the estimated period of existence of the pits, thereby confirming the estimated several decade-long life of a family house. The animal bone material in the pits led to the recognition of some particularly important interrelationships. With the help of analyses into the extent to which the animal breeds could be found and their individual numbers, for example, it was possible to reach some useful conclusions regarding farming practices. Although the proportion of hunted animals at the settlement can be said to have been around 20%, it can nevertheless be seen that it was domesticated animals that provided the main source of nourishment for those living there. It was cattle and sheep bones that proved the most numerous. Through the analysis of the stratgraphic and the finds material we managed to calculate the lifetimes of the pits, which we then divided by the number of the individual animals found, to give us an idea of the population's meat consumption. We concluded that the families ate roughly two cattle and five sheep a year. Such a consumption of meat would have provided an individual's daily calorie demand comfortably. At the same time eating habits would have been influenced by the quantity of domestic animals available for slaughter and the size of the herds. From the ethnographical examples available to us, we knew that in the case of cattle the minimum size for a self-perpetuating herd stood at between 10-50 animals,[25] while with sheep this figure stood at about 60.[26] So it was that we established an optimum number of domestic animals (15 cattle and 30 sheep per household) that was in harmony not only with the quantity of finds, the filling times for the pits, the quantity of meat eaten per household and the number of animals kept, yet also consistent with the rate of growth demanded by the settlement development model from the point of view of the herds and the pasturage model for the neighbouring settlements in the settlement network. From this kind of calculation on herds it was even possible to hazard a guess at the field requirement for the pasturage. According to Hungarian ethnographical data, pasturage for one cow was the equivalent of that necessary for five sheep or five pigs[27] and given that one cow needs half a hectare,[6,28] then 15 cattle and 30 sheep together demanded 10.5 hectares of grazing land. On the question of crop cultivation, although we know that they grew cereals, which was primarily barley and wheat, we don't have any data concerning the possible amount of cereals that was consumed, or indeed the amount of land necessary to grow such quantities. When making our calculations we naturally also took into consideration lands that were unsuitable for both cultivation and grazing around the settlement area. While this of course included the precincts of the settlement itself there would also have been eroded ravines, zones of alkaline soils and wooded areas nearby. It is for this reason that we can only rely on estimates, based for example on the assumption that the lands that were unsuitable for grazing were about the same in extent as those lands that were (e.g. 50% pasture, 20% cereal cultivation, 30% unsuitable for agriculture). This way we came to conclusion that one family's needs would require land in the region of about 20hectares. If one assumes that there were fourteen houses standing at the height of the settlement's lifetime, then a significant amount of land, 280 ha, that is almost 3square kilometers, would have been necessary for its upkeep. Fortunately there are further sources available to us when making our models.

## The zonal model

As we had fairly exact topographical data concerning Linear Pottery Culture (LPC) settlement dispersion around Füzesabony, it was possible to make a zonal model as well. Here in an area of 150km² an interesting network of ALPC settlements was recorded consisting of regularly spaced larger settlements similar to Gubakút, surrounded

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by smaller settlements in their close vicinity.[6] The larger settlements were named central/mother settlements while the smaller sites around them satellites/daughters. The large settlements were aligned by ancient riverbeds and arranged into regular patterns that meant they were always located c. 2 km from one another (Figure 4).

**Table 1(A)** Füzesabony-Gubakút: 1st western settlement row- animal and human bone dating

| Code | Feature | Sample site | Quant. | d13C [‰] | Conv. rc. date (BP) | Calendar Date 1s (cal BC) | Calendar Date 2s (cal BC) |
|---|---|---|---|---|---|---|---|
| deb-5746 | Pit 45 | 3-4. spatedepth | 270 g | -20.53 | 6490±60 | 5474-(5446)-5395 | 5519 -5305 E |
| VERA-4241 | Grave 7 | | 7 g | -21.5±1.0 | 6255±40 | | 5320 -5070 |
| deb-13042 | Grave 9 | | | -20.22 | 6489±40 | 5493-5385 | |
| deb-5871 | 117 | whole pit | 430 g | -20.14 | 3740±75 | 2241-(2136)-1996 | 2358 -1921 R |
| | Grave 8 | | 2 g | | | | |
| deb-5757 | 63 | under 2. spated. | 440 g | -19.9 | 6300±85 | 5315-(5259)-5222 | 5428 -5036 |
| VERA-4240 | Grave 6 | | 10 g | -19.1±0.4 | 6295±35 | | 5350 -5210 |
| | Pit 44.wl | W 38-55 cm | 6 g | | | | |
| deb-5740 | 53 | rel. 77-100 cm | 660 g | -20.93 | 6320±75 | 5326-(5276)-5233 | 5428 -5077 |
| deb-5859 | 54 | 1-2. spatedepth | 720 g | -20.81 | 6320±65 | 5315-(5276)-5236 | 5414 -5201 U |
| VERA-4236 | Grave 4 | | 7,5 g | -18.9±0.5 | 6325±35 | | 5380 -5210 |
| deb-5773 | 52 | 1. spatedepth | 530 g | -19.8 | 6285±90 | 5307-(5250)-5205 | 5424 -5023 |
| deb-11092 | Grave 2 | | | -21.4 | 6250±90 | 5300 - 5080 | |
| VERA-4237 | Grave 1 | | 7 g | -18.3±0.5 | 6295±35 | | 5350 -5210 |
| VERA-4239 | Grave 5 | | 10 g | -19.7±0.6 | 6320±40 | | 5470 -5210 |
| deb-5882 | 51 | rel. 130-150 cm | 370 g | -20.49 | 6550±100 | 5543-(5474)-5413 | 5605 -5297 E |
| VERA-4242 | Grave 10 | | 8 g | -21.6±0.9 | 6295±40 | | 5370 -5200 |
| deb-5875 | Pit 61/1 | rel. 115-140 cm | 890 g | -20.59 | 6325±75 | 5333-(5281)-5235 | 5433 -5085 |
| deb-5777 | 61/2 | S section | 650 g | -19.87 | 6390±45 | 5399-(5321)-5294 | 5439 -5258 U |
| deb-5943 | 89 | 2. section | 690 g | -21.04 | 6485±70 | 5476-(5442)-5379 | 5528 -5294 E |

**Table 1(B)** Füzesabony-Gubakút, 2nd western settlement row - animal and human bone dating

| Code | Feature | Sample site | Quant. | d13C [‰] | Conv. rc. date (BP) | Calendar date 1 s (cal BC) | Calendar date 2 s (cal BC) |
|---|---|---|---|---|---|---|---|
| VERA-4238 | Grave 3 | | 7,5 g | -18.3 ± 0.4 | 6285±35 | | 5350-5200 |
| deb-5900 | Pit 36 | 1. square | 420 g | -20.38 | 6360±40 | 5335-(5301)-5275 | 5405-5245 U |
| | Grave 11. | | 2 g | | | | |
| deb-5897 | Pit 35 | under r. 120 cm | 520 g | -20.2 | 6250±30 | 5247-(5235)-5224 | 5269-5200 L |

**Table 1(C)** Füzesabony-Gubakút, 1st eastern settlement row- animal and human bone dating

| Code | Feature | Sample site | Quant. | d13C [‰] | Conv. rc. date (BP) | Calendar date 1 s (cal BC) | Calendar date 2 s (cal BC) |
|---|---|---|---|---|---|---|---|
| deb-13052 | Pit 14. | | | -21,22 | 6331±63 | 5369 -5238 | |
| deb-5941 | Pit 131. | under the hearth | 350 g | -20.91 | 6345±70 | 5382-(5294)-5243 | 5443-5213 U |
| deb-5857 | Pit 21. | 1. square | 840 g | -20.3 | 6195±60 | 5236-(5205)-5039 | 5272-4996 |

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**Table 1(D)** Füzesabony-Gubakút, 2nd western settlement row- animal and human bone dating

| Code | Feature | Sample site | Quant. | d13C [‰] | Conv. rc. date (BP) | Calendar date 1 s (cal BC) | Calendar date 2 s (cal BC) |
|---|---|---|---|---|---|---|---|
| | Grave 12. | | 2 g | | | | |
| deb-11892 | Pit 134. | N section | | -20,58 | 6110±50 | 5210-4930 | 5219-4857 |
| | Grave 13. | | 2 g | | | | |
| deb-5937 | Pit133/A. | 2-3. spatedepth | 320 g | -20.71 | 6300±65 | 5304-(5259)-5231 | 5396-5076 |
| deb-5939 | Pit 19. | rel. 170-185 cm | 270 g | -20.56 | 6310±60 | 5306-(5267)-5235 | 5396-5201 U |
| deb-5906 | Pit 135. | 4. spatedepth | 430 g | -20.29 | 6600±55 | 5547-(5510)-5472 | 5573-5444 E |

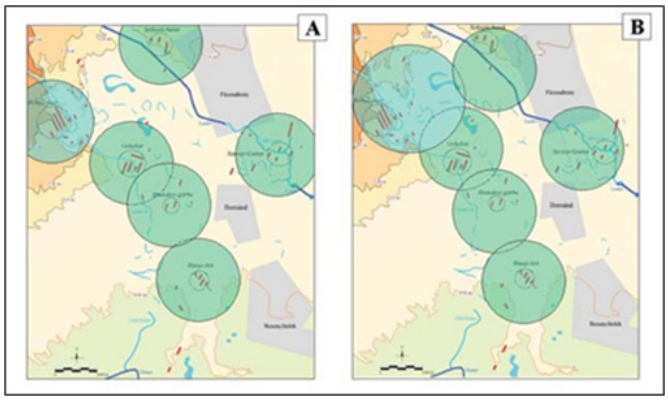


**Figure 4** Modeling the land use within the Neolithic settlement zone around Füzesabony with circles of 1 km in radius around the central/mother settlements.

A. with pastures of standard size and fixed position

B. with pastures of varied size and optimized position

This distance can be overlapped if we draw circles with 1 km radius around the settlements. By calculating possible population estimates and house numbers, as well as data concerning meat consumption and animal keeping, we have in all likelihood found an explanation for the development of the neolithic settlement zone around Füzesabony. From this data it could be concluded, that the circles of 1 km radius, that is equivalent to 314 ha, probably met the requirements for the pasturage necessary for grazing 15 cattle and 30 sheep per household for a settlement of 14 families, as it was calculated above.[1] It looked as though the extent of the pasturage would have been the greatest determining factor in the sustainability of an area during this phase of the Neolithic. It was probably the size and quality of the available pasturage that determined how far a settlement could spread and how many people could live there. Of course the sustainability of the settlement areas also determined how many people had to leave the settlement and start a new life elsewhere. Although the data seemed to be scarce, it was still possible to say something about the dynamics of the neolithic settlement zone around Füzesabony. On the evidence of the few radiocarbon dates we had from the individual settlements it was possible to suggest not only that the mother settlements were more or less contemporaneous, but that they evolved according to the same rhythms as those seen at Füzesabony-Gubakút. From the regularly-spaced settlement pattern we supposed that the individual mother settlements represented different lineages (clans). The first settlers probably came from the area of the Körös Culture and settled on the best lands available. Their descendants mostly lived at, or in the vicinity of, these central settlements. Over time the entire area was populated, with roughly similar boundaries, c. 1 km in radius evolving around each individual central/mother settlement. From that time onwards, when the number of contemporaneous households exceeded the limit of 12-14 houses within the circle of 1 km radius, there might have been restrictions on the number of people wanting to settle in and around the mother settlements, to such an extent that some family members probably had to settle elsewhere. At the same time, a fierce rivalry might have occurred between the different clans. Ultimately the whole network of settlements suffered an abrupt collapse and almost the entire area became depopulated.[24]

[1]These data seem congruent with the independent calculation made by I. Vörös for the economy of Körös Culture households.

## The regional model

We believed that the reconstruction of the settlement history of Füzesabony-Gubakút could act as a model at micro level in the same way that the reconstruction of the neolithic settlement zone around Füzesabony provided a model at meso level. It was also possible to draw up a model at macro level for the spread of the ALPC within the northern periphery of the Great Hungarian Plain (Alföld) as a whole.[6]

In our opinion the spread of the ALPC to the north and west happened mainly as a result of population movement.[6,17] Our thesis seems to be supported by new DNA results gained from skeletons of the ALPC population.[29] As such one can probably talk in terms of a gradual, partly swift, partly slow, colonization process, during the course of which small communities were founded over large areas in previously unknown, uninhabited, yet well-endowed territories. In our view the settlement development processes consisted of a number of stages and varied zone by zone. We assumed the descendants of the arriving migrant families either stayed where they were (in the mother settlement), or founded new colonies in the vicinity or slightly further away (within or beyond the settlement zone). So the ALPC's 600-year history witnessed the establishment of extensive settlement networks right up to the point where the land was saturated. It was then that society changed and the Tisza Culture emerged.

Our model describing the development of the ALPC has evolved over a number of years, with its primary aim being to outline the evolution of a typical ALPC settlement. It wasn't surprising that a fairly similar model was formed to describe the settlement development of the Transdanubian or Central-European Linear Pottery Culture (TLPC, or in short LBK) by S Shennan & A Zimmermann.[30,31] What we now know about the ALPC and TLPC/LBK is that they bear a

significantly greater resemblance to one another than was previously thought. Today those differences in settlement structure that were once considered to have been important are now seen to be increasingly insignificant, to the extent that the contemporaneous developments going on in the eastern and western halves of the Carpathian Basin are now noted for those similarities that are becoming ever more apparent. Research in the last decades brought to light large LBK settlements in the area of Transdanubia, in the vicinity of Budapest and even to the east of the Danube.[32–34] There are indications that during settlement reconstructions of the LBK one should take into account the possibility of settlement rows and not only in Transdanubia, but in the wider area of the LBK too.[35,36] Indeed, surprising similarities can be seen between the settlement layouts of the LBK/TLPC and ALPC.[31,36–41] The research issues in all areas are for the most part similar and it is for this reason that the answers that have been offered to the problems faced can be for the most part applied generally.[30,31,42]

## The model's strong and weak points

In recent years it is true to say that in the realms of both archaeological interpretation and theory we have distanced ourselves from earlier points of view rooted in the 1960s and 1970s. While we have come up with entirely new models however, as is the case with any model - as a means of coping with the complexities involved - there comes a time when one almost loses touch with the original findings. Let us examine then what are facts and what are fictions in our model.

The basis of the model in question can be found in the data from the Füzesabony-Gubakút excavation. This consists of a regular settlement layout made up of rows of pit-house-grave ensembles which, with the help of stratgraphic, the C14 and seriation data has now also been analysed from a chronological point of view. The chronological data from the graves and the pits has proved overwhelmingly that the houses, graves and pits belonged to one another. Based on this - and having uncovered numerous internal interrelationships - we were able to reconstruct a scheme of settlement development based on reasonably firm foundations. Indeed, we were able to refine our data right down to the level of individual households. Thus, we were able to establish that one household unit lasted for 30-50 years, which could theoretically have coincided with the length of one generation. The individual households represented family units, which took the form of house-grave-pit ensembles which were situated next door to one another. The people buried in the graves immediately next to the houses may well have once lived in the houses themselves and put their rubbish into the near lying pits, from where we took them as precious archaeological finds.

The finds in the pits next to the houses and on the occupation surfaces provide us with information about the everyday objects people used and the food they ate. Therefore one can say for the most part what each household possessed and what it consumed. We attempted to calculate the active life of the pits using stratgraphic techniques and experimental archaeology. Although this method contained the risk of subjectivity, the analysis of the finds correlated well with the data we had. For example, the number of vessels we found corresponded well with the data referring to similar objects in other periods[43] and the conclusion drawn from the animal bones also fit harmoniously into the system.

The bones of the consumed animals are those of animals that once lived locally and from this one can draw many important conclusions concerning the farming that went on. The breakdown in the breeds of animals and the analysis of the animal numbers any one household had was one of the underpinning elements of our model. It emerged that if one assumed that each family had five or six members and one accepted the previously held view that each pit had a lifetime of ten years, then the inhabitants of the neolithic settlements in question had plenty of meat at their disposal, which would have covered people's calorie requirements on its own. On top of this of course they would also have had cereals and any other forms of nourishment they had gathered. Indeed, the local population would have had other secondary processed products that they would have made in significant quantities, like milk and cheese. This is a conclusion that is confirmed not only by the presence of skimming utensils, but also by the 1-2 goats which each household kept for that purpose.

Because of the dominance of cows and sheep in the finds one is forced to consider the issue of herds. Using the ethnographical data one could assume that animal husbandry took place in herds that were small yet stable in size, which formed the basis of a successful and sustainable husbandry. But from the bone material it became clear that one needed to think not in terms of a single herd, but individual households having their own individual herds. This is something that once again prompts the question as to how much land was necessary. It was here that we were once again dependent on ethnographical parallels, namely a figure of two cows per hectare for grazing purposes, with one cow's grazing needs being the equivalent to that of five sheep. At the same time we also applied a rule of thumb whereby we assumed that land use for one family or household took the form of 50% pasture, 20% arable plots and 30% unusable wasteland. While this was probably one of the estimates least based on solid data, it is correlated well with our own findings and the topography of the site, creating a consistent unity in the process.

The recognition of such very important interrelationships was helped by the topographical analysis of the area around the Gubakút site, which was the result of many years of systematic fieldwork. At most sites it was possible to identify site topography and settlement layout and in some cases it was possible to make excavations and surface collections, even to the point of gaining chronological data. Using Gubakút as an example it was possible to apply excavational observations to fieldwork data, making it possible to guess how the field data fitted in with the settlement layouts. By looking at the relative sizes of the settlements in the Gubakút settlement zone it felt logical to divide the settlements into mother settlements and daughter settlements. Claims of subjectivity can only justifiably be made to the way the dynamic of settlement was sketched out. At Gubakút the extent of the settlement evidence around the excavation was a given thing, as was the row system in the excavated settlement. In actual fact we extrapolated the excavational data when, from the data of the most extensively examined western settlement row, we set about establishing the number of contemporaneous houses. Our system for the development of the settlement resulted in a natural Gauss Curve where the peak slipped a little towards the final period, the 4th phase. This suggested a period of deliberate and dynamic growth accompanied by occasional hiatuses. It is interesting that in the territory of the LBK similar observations were also made in connection with settlement development. There the hiatuses were ascribed to climatic changes.[44]

As the extent of the Gubakút site is that of the average mother settlement, those reconstructions suggesting it never exceeded 14

houses at any one time, can without any doubt also be applied to other similarly sized mother settlements. Thus at those settlements with a similarly high number of houses and grazing needs can be postulated. From a topographical point of view it is striking that the larger settlements are on average two kilometres from one another and surrounded by their own area of pastureland. Such data concerning the size of the individual settlements has proved particularly useful when applied to the question of the settlers' grazing requirements. While the position of the pasture within the Thiessen polygon has also become apparent in the LBK models, the poor condition of the animal bones which have come to light in the pits there suggest one cannot count on the same vibrant animal husbandry as can be found here. It is for this reason that the scholars of the LBK might not have known how important the pastures were to a settlement's topography.[31] In our case surprisingly the size of the greensward around the settlements correlated really well with the supposed grazing requirements of the herds, the readily available explanation for which is probably that it was the size of the herd that determined the size of the one-time settlements. This was a train of thought that now cast light on both human and social relationships, in doing so making it probable that after a time, when the settlement zone had become fully occupied, some serious competition may have resulted. This also prompted the possibility that the spread of the Linear Pottery Culture led to an overpopulation of the areas in question that caused the excess population to migrate to the areas both in the vicinity and beyond.

The large increase in population was reflected at settlements, where settlement phases were worked out, as the dynamic increase in the number of houses standing at any one time were obvious in most places. This is not only apparent in Gubakút it can also be seen in TLPC/LBK settlements.[45,46] The large increase in population is also justified by the swift speed of the neolithization, the rapid spread into uninhabited or thinly populated territories.[47] According to archaeo-ethnographical data one should count with exceptionally large growth in population during the course of the first phase of the neolithization.[48]

Although hereditary models will always be subjective they can still act as a practical model particularly in our case. The theory of rival clans and male dominance among the herders is also something that lacks confirmation. Although there are signs that this was indeed the case, it is to be hoped that it will not be too long before the DNA data will supply us with the necessary proofs. For the time being then its lifelike character and the compactness as a means of explanation make both hereditary and clan models probable and it is for this reason that this model is favoured by some.[30]

With reference to the spread of neolithic culture a complex explanation has emerged, in which the migration, which followed the successful settlement of one particular area resulted from a combination of a significant increase in the population, the preference for cattle as the domestic animal of choice and the need for ever greater grazing areas that accompanied it. It is for this reason that one needs to stress the importance of animal husbandry in connection with neolithization, both here in the spread of early and middle neolithic cultures within the Carpathian Basin and elsewhere in the more westerly lying areas of the LBK. While the predominance of cattle husbandry from the Linear Pottery period onwards has been known for a long time and the conclusion that accompanies it appears to be sufficiently self evident, it is still necessary to make the point that it is also applies to the territory of the Körös Culture. While cattle husbandry is also characteristic of the Körös Culture territories, the size of the pasturage available was smaller, making the need to migrate even greater. (Irrespective of this the speed of neolithization in the two cultures of the Carpathian Basin was more or less the same). Although the shift from Körös Culture to ALPC in the southern part of the Great Plain appears to have taken place free of conflict, the density of settlements here decreased somewhat during the ALPC period, something which may point to the more intensive nature of cattle husbandry.[22] This certainly had something to do with the changes going on in social relationships, as the property relations existing in connection with the herds would in time have led to the stratification of society. Here we reach again the furthest extent of our period, after which the Tisza Culture brings with it significant changes in both the spheres of human and social relationships. From this period onwards one faces significant settlement concentration, the existence of dominant settlements, centres of power even and the emergence of social stratification. This is already the period of the tell cultures and the great round structures (rondells). Although we still have not modelled the period from the emergence of the Körös to the end of the Tisza-Herpály Cultures, of the models that do exist it is M Bandy's[49] society development model that can be best applied to a description of the evolution of the Neolithic in the Carpathian Basin.[49] It is with this model that our present knowledge is most able to harmonize. When examining the development of the Neolithic, the Bandy model was tested out on almost every centre of civilization and it was for precisely this reason that it draws attention to the regularity and conformity existing within neolithic societies.

Although it could appear rather strange that it is we ourselves who are evaluating our own model, this is unavoidable if we want to refine what we know and bring our knowledge right up to date in the face of new findings. And here, rather than wishing to defend our model to the last and to prove ourselves correct, it is our intention to improve our understanding of the neolithic process and to help others in their understanding of it. Obviously we are aware that good basic data is necessary, but there always comes a point at which one needs to draw upon one's imagination to fill the gaps in our knowledge, particularly regarding social structure and historical context. In order to be able to reconstruct the settlement histories as realistically as possible we had of course to interpret our data. It is the model's job to fill the gaps in the data with plausible explanations when necessary. If it were possible to prove everything we wouldn't need to create models. Models are useful in as much as they help our understanding up to that point when new data becomes available or another more convincing theoretical scheme makes the model redundant. So it is that the model should be subject to continual testing and query.

## New data from füzesabony-gubakút

In recent years five new radiocarbon dating have been made from the site. Four of these were from graves and were dated in a laboratory in Oxford. This dating work could not have been done anywhere else on account of the poor condition of the bones. The fifth dating, also made in Oxford, was from walking surface 44, which was the only surface uncovered extensively during the course of the excavation.[2]

Unfortunately, because of publication rights, we are not allowed to publish our new 5 dates here. Here we can only say that all of the new data fitted into our former system well. The dates for the graves do not deviate significantly from the dates for the neighbouring pits (Table (1A-1D)) and the dating of walking surface 44 fortunately fits perfectly with the dates from the adjacent pit 53. In our model much

[2]The measurements were made courtesy of a joint grant application with A. Whittle, to whom we are extremely grateful.

**Citation:** Domboróczki L, Kalli A, Makoldi M, et al. The füzesabony-gubakút settlement development model of the alföld linear pottery culture in the light of the recent archaeological discoveries at hejőpapi-szeméttelep (2008-2011) and bükkábrány-bánya vii -vasúti dűlő (2009-2011). *J His Arch & Anthropol Sci.* 2017;2(2):31–43. DOI: 10.15406/jhaas.2017.02.00046

 

relied on pit 53 and walking surface 44 being from the lifetime of one and the same house. This is something supported not only by the proximity of the two places but the similar types of finds as well.[6] Similarly, during the course of the creation of the chronological scheme we paid special attention to the regularity existing at the site and where graves and pits were adjacent to one another we managed to put them into the same chronological sub phase. This helped us to establish the position of the houses within the context of house-pit-grave ensembles and treat them as basic household units[6] To this end the new results should be considered as a kind of retrospective test for the system. Now, our chronological system seems to stand on a firmer footing than at any previous time and the basic premises underpinning the settlement structure model seem to be in order, however in the near future another test will be made with all our C14 data, that will be based upon the Bayesian method and as it relies on different principles than our present one, it may well bring new results even reach other conclusions (Table (1A-1D)).

## New excavation data: hejőpapi-szeméttelep, bükkábrány-bánya vii.-vasúti dűlő

### The hejőpapi-szeméttelep site

An excavation conducted by Miklós Makoldi, János Veres and Éva Selján The site in question was situated on the administrative border of the villages of Hejőpapi and Hejőszalonta (Hejőpapi - reference point 073/5) on the area of a regional landfill. It was here that three archaeological sites and one place of archaeological interest was located as part of a preliminary archaeological impact study. The archaeological excavation of these sites took place between 2008 and 2010 under the aegis of the Borsod-Abaúj-Zemplén County Museums.

Over an area of 60.000m² it was possible to uncover of a 4 ha large neolithic settlement almost in its entirety (site 1, site extension 1, site 4), together with an entire Celtic cemetery (site 3), a Roman Imperial period cemetery, with grave finds including swords, shields and horse accoutrements (site 1) and a Roman Imperial period settlement (site extension 1, site 4) which we were able to excavate partially (Figure 5).

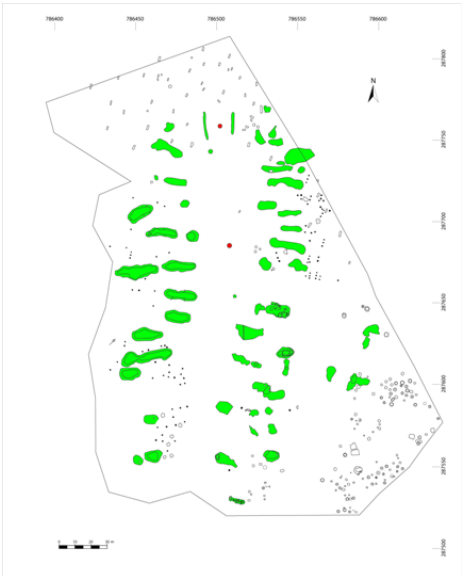

**Figure 5** The excavation area with the main Neolithic features at Hejőpapi-Szeméttelep (with pits /green/ and postholes /black/).

The study of the neolithic settlement began in the autumn of 2008 under the leadership of János Veres and continued in 2009 and 2010 under the leadership of Miklós Makoldi. In 2008 János Veres excavated site 4 on the eastern side of the landfill, while at the same time examining site 1 in the north-eastern corner with the aid of explorational trenches. Site 1 lay at a distance of 200 metres from site 4. At both sites neolithic features came to light, something which led to the area between the two sites being excavated as well. So it was that site 1 and site 4 eventually found themselves adjacent to one another. As a result the archaeological features found at the two sites were treated as if they came from the same unit and given continuous numbering.

In 2008 János Veres established 182 stratigraphic units (site 4 - 1.4 ha), of which about a quarter were associated with neolithic settlement features among them long pits characteristic of neolithic Alföld Linear Pottery Culture (ALPC). From the neolithic settlement area numerous clay idols and cultic objects came to light. Part of the finds can be dated to the early phase of the ALPC.[50]

During the course of the excavation of site 1 between 25th March and August 26th 2009, another 1.6 ha of territory was uncovered, revealing several other features of the neolithic settlement. Apart from the long pits we also found post holes and a well. At this time we were also able to establish another 335 stratigraphic units, where we located 40 neolithic settlement features and 52 Sarmatian graves. It was also possible to establish that the neolithic settlement continued for a short distance in an easterly direction. However, because this fell beyond the precincts of the landfill site it was impossible to excavate there. Nevertheless to the west we discovered there was a large empty space after which the long pits and the traces of post-framed houses re-continued. For this reason it was necessary to extend the area of excavation in a westerly direction.

The excavation of the neolithic site further westwards took place during the autumn of 2010 - taking the form of exploratory trenches. It was then that it was discovered that the neolithic site continued further in westerly direction in the form of a row of long pits, which then went off in a south westerly direction beyond the furthest extents of the sites 1-4 and continued further to the area lying to the west of site 4. This area was named site extension 1. We excavated 1.3 hectares of it in all from June 14th to September 23.

Site extension 1 is thus an organic continuation of site 1, which lies north-northeast of it and site 4 as excavated by János Veres in 2008 to the east. As a result the three parts of the neolithic settlement were treated as one entity. A large proportion of the 900 stratigraphic units established up to the autumn of 2010 belonged to this neolithic settlement, despite the fact that during the course of 2010 a continuation of a Sarmatian settlement fragment which had already been located on site 4 was found.

By the autumn of 2010 we had been able to establish the extent of the neolithic settlement in both a western and a southern direction. The excavated area of the ALPC settlement reached 4 ha. Although we had not been able to uncover what lay beyond the north-north-eastern extents of the site, we could only assume that the site did not extend too far in that direction. It should be mentioned that during the course of the excavation it occurred to us that there may indeed be a further continuation of the settlement to the west (within the precincts of the landfill site) after a substantial gap. It is for this reason that we dug an exploratory trench on the west side of the site, which proved

**Citation:** Domboróczki L, Kalli A, Makoldi M, et al. The füzesabony-gubakút settlement development model of the alföld linear pottery culture in the light of the recent archaeological discoveries at hejőpapi-szeméttelep (2008-2011) and bükkábrány-bánya vii -vasúti dűlő (2009-2011). *J His Arch & Anthropol Sci.* 2017;2(2):31–43. DOI: 10.15406/jhaas.2017.02.00046

negative from an archaeological point of view. Also in the summer of 2009, at the time we were excavating site 1, we dug some exploratory trenches in the 1.5 hectare area to the west of site 1 (site 2), which also proved negative. In doing so we managed to establish the extent of the neolithic settlement to the west.

Thus, between 2008 and 2010 at least 90% of the neolithic ALPC settlement had been excavated. This settlement is of great scientific importance not only because of its size and its rich, early finds material, but also because of its unique layout. This layout can easily be traced: there was a 40 metre-wide and 200 metre-long empty central area stretching in an N-S direction surrounded on three sides by long pits and post-framed structures. In the middle of the empty area lay a well, from which material from the ALPC II phase came to light. The long pits pointed in E-W direction and were arranged in two rows to the eastern and western sides of the empty area and it was these two rows that closed or tied together the 2 N-S long pits on the northern side. The layout of the site should be considered complete.

### The bükkábrány-bánya vii.-vasúti-dűlő site

An excavation undertaken by András Kalli and Eszter Tutkovics In the course of the archaeological research that took place between June and December 2011, before the Bükkábrány lignite mine went into production, an almost 3 ha large settlement fragment from the early ALPC was excavated (Figure 6). The site stood on the highest point of a NE-SW directed, irregularly-shaped hillock rising out of a wide flood plain of the Csincse stream that is running more or less perpendicular to that elevation.[3] During the course of the excavation at the neolithic settlement which lay on a NE-SW axis we found a settlement structure which while unusual was not completely unknown in north-eastern Hungary. The settlement axis was formed by an empty strip, in which there were wells, on the two sides of which ran two parallel settlement rows. The settlement was accompanied to the northwest by some large irregularly shaped refuse pits, in which hardly any finds came to light. To the SE of these we found some large, albeit shallow, elongated clay pits, which also lay on a NW-SE axis? Among these, positioned slightly to the SE, we found some post holes betraying the existence of houses, which were also lined up in a NW-SE direction. This showed that the houses had been built on the same NW-SE axis as the pits from which the building material had been extracted. There were only a few cases in which a house had more than three post holes and these came to light in groups of three. To the SE of the post traces we uncovered skeletal burial remains which had been laid out in a SE-NW direction lying on their left sides, in a foetal position and with no grave goods.

To the SE of the burials was a strip of land about 50m wide in which no features were found. In the middle of the strip were two wells, both of which stood on the same axis as the neolithic settlement. To the SE of the empty strip we found some more post holes arranged in threes like those we had found earlier, accompanied by clay and refuse pits. The interesting thing about the section lying to the SE from the so-called settlement axis was that the two burials here were found in the clay pits: one was a small child laid out in SE-NW direction, the other was only an irregularly positioned top part of a body belonging to a young individual. It is important to mention, that we also uncovered fireplaces accompanying some of the settlement's pits and a well at the SW foot of the hillock on which the settlement stood.

[4]At site VII. we also excavated fetaures from a fragment of a Roman Imperial period Sarmatian settlement. From our 2011 excavations see: Kalli-Tutkovics RKM 2011 (2012) In press.

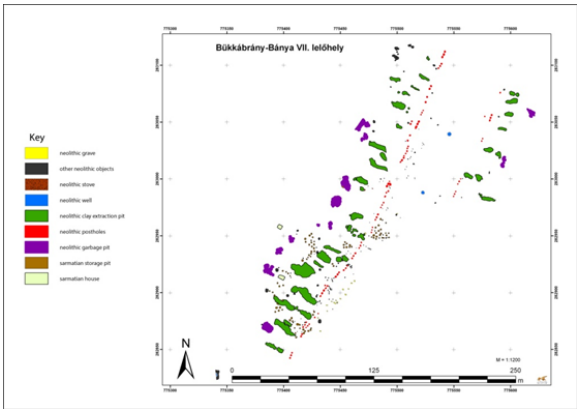


**Figure 6** The excavation area at Bükkábrány-Bánya VII.-Vasúti-dűlő.

## Conclusion

### Testing the model in the light of the most recent excavation data

The most recent excavation results described above should be considered excellent test data for our Füzesabony-Gubakút model. The sites were excavated in almost their entirety and as a result we were able to gain a lot of interesting new information, capable of proving, adding to or indeed contradicting the Füzesabony-Gubakút model (fortunately this final possibility didn't in fact materialize). As the processing of the finds from these excavations is still to come, the test in question is only really relevant for the structure of the settlement. Even so it is possible to draw serious conclusions from the data we already have.

At Hejőpapi and Bükkábrány we have further confirmation of the row-like settlement structure. This is something we could expect in the light not only of the Füzesabony-Gubakút findings, but by what we had observed at published sites such as Mezőszemere-Kismari-fenék, Füzesabony-Szikszói-berek, or even Ludas-Varjú dűlő where a dense settlement structure had been observed.[6,15,17] Hejőpapi and Bükkábrány confirmed that it is also possible to talk in terms of particularly long settlement rows and that using it as a reference point; the projecting out of the settlement features within the excavation area to the whole area of the fieldwork surface collection at Gubakút was a justifiable decision (Figure 3).

The excavations confirmed that the settlement rows indeed consisted of house, pit and grave ensembles. The axes of the houses and the pits lie perpendicularly to the settlement rows, for the most part in a NW-SE direction. In the case of Hejőpapi the position of some of the houses can only be guessed at. This occurred where the post holes were found at the edge of the pits and appeared in threes. Here the removal of the humus level prior to the archaeological work unfortunately went too deep and it is this that probably accounts for the lack of further post holes and graves. At Bükkábrány the post holes tended to be found in rows at the ends of the pits. As we are talking here about houses rather than fences, any post holes outside the line of the rows probably marked the internal layout of the house. Graves also appeared at the site, for the most part in the same positions as they were found in Gubakút, namely on the shorter sides of the houses opposite the pits, in the vicinity of the supposed position of the entrances. Looking at the distances between the pits and the graves we can guess that the houses here were about 12-16 m long, while the groups of three post holes suggest that their width was in the region

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of 6 m. In actual fact post-framed houses have also been uncovered at other more recent excavations thereby confirming their existence.[13]

With their complete excavation Hejőpapi and Bükkábrány have also proved that there were large empty spaces between the settlement rows. Distances of 50-60 m separated the pit rows from one another, which, if seen in terms of house rows amount to large empty spaces. At Gubakút and Mezőszemere we did not conduct a complete excavation because the magnetometer measurements didn't register anything between the pit rows and in the interests of cutting costs, we were forced to model the most likely topography from the findings we had, but these most recent excavations for the most part confirm the correctness of that model. One exceptionally important piece of information that we previously didn't know was that wells stood in these empty spaces. This space therefore could have formed the central square of the settlement and that the wells were obviously for common use. At Hejőpapi and Bükkábrány although the wells excavated did not have wooden linings there were some finds (including charred seeds) in them. In our Gubakút model we supposed there to be a track running along these interior spaces, indeed we even went as far as reconstructing the entrance to the houses on that side. This hypothesis appears to have been supported by the existance of wells and the communal space.

The complete excavation at Hejőpapi produced yet another interesting observation, namely the long NE-SW pit rows closing the NW-SE settlement row, which gave the settlement pattern a rectangular format. That this was not only peculiar to Hejőpapi can be seen by looking at the findings at Gubakút, where - albeit only on the basis of surface collection finds - a similar layout was found (Figure 3). This is without a doubt interesting and indeed important information, as we are now on the threshold of discovering the final form the settlements took. So, we now know that the settlement rows were closed up after a time and rather than building the houses to the sides of the rows they were built perpendicular to them. This adds further proof to the notion of a deliberate planning process. It is worth reminding ourselves that this kind of closing in of the settlement did not come about for any geographical reasons, whether that is a rise in the terrain or a lack of space. There must have been some other reason, which should be considered a structural element of the mental make-up of the time. Although in the past we have dedicated many pages to analysing the regularity of the neolithic settlements, at no time did we know that it was a rectangle that lay at the back of people's minds.[6,17]

One can discount the conclusion that this settlement pattern can be applied across the board, as there are smaller settlements consisting of only one or two pits and row-like settlements consisting of only one or two shorter rows. In addition, as we know now, there are such settlements that are large, totally closed off, rectangular rather than row-like, which one could term completely self-contained and thereby totally incapable of being added to. Earlier we went to great lengths to explain that the lack of super positioning was due to a deliberate decision not to build on previously occupied places, in places where houses had already stood and that they chose instead to add their houses somewhere along the linear rows where no house stood. From the chronological data it followed that at the beginning the rows were less densely populated and that the house positions were set further away from one another. We concluded that this had been done in such a way right from the beginning in order that these spaces could be filled in to form more condensed settlement rows at a later date. The gaps would gradually be filled in and in the longer lasting settlements one can see the rows becoming more and more densely populated. We can suppose that the wooden houses lasted for a long period of time[46] and once they had been built these houses stood as firm reference points, indeed it became more and more probable that rather than standing in a derelict state they were lived in continuously. At the same time however it does seem unlikely for the time being that all the houses that had been constructed were inhabited continuously. Despite the dating we got from the refuse pits there is a suggestion that the refuse pits were initially suited to supplying the clay necessary in the construction of the houses.

These were quickly filled and not even used for house repairs. It is for this reason that the dating for the refuse pits can only tell us about the construction of the houses, while shedding only a little light on what went on during the period in which the house was actually used. Could it therefore be that we are dealing here with settlements that were much more densely populated than we previously thought? The houses that stood within the linear settlement structure for a long period of time (for even as long as 100-150 years) were neither destroyed nor demolished. At Gubakút the new buildings in the settlement rows always respected the position of previously built houses. Certainly some respect was being paid to the memory of their ancestors in this regard. Strict traditions may have regulated the way in which building took place. At the same time if somebody built a house they also had to take the climate into consideration, something that would explain why the houses and their pits pointed predominantly in one main direction (NW-SE or perpendicularly to it, NE-SW). The inhabitants also had to abide by the settlement row. If the row had already been established then every new builder had to adjust himself to it, but if such a row had not yet been established, then even the first builder had to take into consideration the future row when marking out the position of his house. Above and beyond that, as at Hejőpapi, one can see that the size of the settlement row could also be important, as the settlement rows would eventually be closed. The deliberate planning, the coded regulatory system that could be found at the heart of these people being is a highly significant discovery. Today it would now appear that the key question is whether or not a settlement had actually developed as far as the mature stage, with closure of the settlement rows. This is a philosophy that was very similar to that held by the tell builders. Although it was not possible for a tall to be built in just one or two generations we do however know that the first inhabitants at a site were imbued with a tell-building mentality. It was in this way that they designed and constructed their buildings and used and inhabited the area and it was over a long period of time that tall grew taller and taller. While in the case of the tells they grew upwards, with the linear sites the inhabitants built horizontally, adding onto rows and only in the rarest cases were houses allowed to be repaired or renovated. The closed, rectangular settlement layout, in actual fact also pays homage to talls and can be related ultimately to architecture of the Cucuten-Tripolje culture, albeit in the case of the latter at a considerable chronological distance.[51,52]

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## Conflict of interest

Author declares that there is no conflict of interest.

 

## References


1. Kalicz N, Makkay J. Die Linienbandkeramik In Der Grossen Ungarischen Tiefebene. *Studia Archaeologica*. Hungary; 1977. p. 385.
2. Makkay J. Some Comments on the Settlement Patterns of the Alföld Linear Pottery. Siedlungen Der Kultur Mit Linearkeramik in Europa. Internationales Kolloquium Nové Vozokany, *Slovakia*. 1982. p. 157−166.
3. Horváth F. A Survey on the Development of Neolithic Settlement Pattern and House Types in the Tisza Region. Neolithic of Southeastern Europe and its Near Eastern Connections. Varia Archaeoligica Hungarica Ii. 1989. p. 85−96.
4. Domboróczki L. The Excavation At Füzesabony-Gubakút. Preliminary Report. In: Kertész R & Makkay J, editors. From the Mesolithic to the Neolithic, Proceedings of the International Archaeological Conference Held in the Damjanich Museum of Szolnok, September 22-27 1996. *Archaeolingua*. 2001a;11:193−214.
5. Domboróczki L. A Füzesabony-Gubakúti Településtörténeti Modell. *Agria*. 2006;12:475−485.
6. Domboróczki L. Settlement Structures of the Alföld Linear Pottery Culture (Alpc) in Heves County (North-Eastern Hungary): Development Models and Historical Reconstructions on Micro, Mezo and Macro Levels. In: Kozłowski JK, editor. "The Interactions between Different Models of Neolithization North of the Central European Agro-Ecological Barrier" *Prace Komisji Prehistorii Karpat*. 2009;4:75−127.
7. Childe VG. *Man Makes Himself*. The New American Library, USA; 1936. p. 183.
8. Kalicz N, Makkay J. Probleme Des Frühen Neolithikums Der Nördlichen Tiefebene. *Aktuelle Fragen Der Bandkeramik*. Hungary; 1972;12:77−92.
9. Lichardus J. Beitrag Zur Chronologischen Stellung Der Östlichen Linearbandkeramik in Der Slowakei. Alba Regia, Hungary; 1972. p. 107–122.
10. Comsa E. Über Das Neolithikum In Westrumänien. *Acta Antiqua Et Achaeologica*. 1971;14:31–42.
11. Makkay J. Entstehung, Blüte Und Ende Der Theiss-Kultur. In: Lichardus J, editor. Die Kupferzeit Als Historische Epoche. Symposium in Saarbrücken Und Otzenhausen, Germany; 1991. p. 319–328.
12. Kalicz N, Koós J. Eine Siedlung Mit Ältestneolithischen Hausresten Und Gräbern in Nordostungarn. In: Lazić M, editor. Antidoron Completis Lxv Annis Dragoslav Srejović Ab Amicis Collegis Discipulis Oblatum, Hungary; 1997. p. 125–135.
13. Raczky P. House-Structures under Change on the Great Hungarian Plain in Earlier Phases of the Neolithic. In: Tasić N, Grozdanov C, editors. *Homage to Milutin Garašanin*. Serbia; 2006. p. 379–398.
14. Domboróczki L. Füzesabony-Gubakút. Újkőkori Falu A Kr E Vi Évezredből. In: Raczky P, et al. editor. Az M3-As Autópálya Régészeti Leletmentései, Hungary, 19-27, 1997;162–164.
15. Domboróczki L. Településszerkezeti Sajátosságok A Középső Neolitikum Időszakából Heves Megye Területéről. In: Dani J, et al. editor. Momosz I. "Fiatal Őskoros Kutatók" I. Összejövetelének Konferenciakötete. Hungary; 2001b. p. 67–94.
16. Domboróczki L. The Older Phase of the Neolithic in North-Eastern Hungary in the Light of Archaeological Finds From Heves County. Az Újkőkor Idősebb Szakasza Ék-Magyarországon, A Heves Megyei Régészeti Leletek Fényében. In: Vento ME, Guérin P, editors. Early Farmers in Europe, A Korai Földművelők Európában, Spain; 2001c. p. 15–47.
17. Domboróczki L. *Radiocarbon Data from Neolithic Archaeological Sites in Heves County (North-Eastern Hungary)*. Agria; 2003;39:5–71.
18. Domboróczki L. A Körös-Kultura Eszaki Elterjedesi Hataranak Problematikaja a Tiszaszolos-Domahaza-Pusztan Vegzett Asatas Eredmenyeinek Fenyeben. *Archeometriai Műhely*. 2005;2:1–11.
19. Domboróczki L, Raczky P. Excavation at Ibrány-Nagyerdő and the Northernmost Distribution of the Körös Culture in Hungary. In: Kozłowski JK, Raczky P, editors. *Neolithization of the Carpathian Basin: Northernmost Distribution of the Starčevo/Körös Culture*. Polska Akademia Umiejętności, Hungary; 2010. p. 191–218.
20. Domboróczki L. The Problem of the Neolithization in North-Eastern Hungary. Older Theories and New Perspectives. In: Gronenborn D, Petrasch J, editors. Die Neolithisierung Mitteleuropas, The Spread of the Neolithic to Central Europe, *Römisch-Germanischen Zentralmuseum Tagungen Band*. 2010a;4(1):175–187.
21. Domboróczki L. A Neolitizáció Problémaköre Kelet-Magyarország Területén. Heves Megyei Múzeumok Igazgatósága, Hungary; 2012.
22. Domboróczki L. Report on the Excavation at Tiszaszőlős-Domaháza-Puszta and a New Model for the Spread of the Körös Culture. In: Kozłowski JK, Raczky P, editors. Neolithization of the Carpathian Basin: Northernmost Distribution of the Starčevo/Körös Culture. Polska Akademia Umiejętności, Poland; 2010b. p. 137–176.
23. Domboróczki L, Kaczanowska M, Kozłowski JK. The Neolithic Settlement at Tiszaszőlős-Domaháza-Puszta and the Question of the Northern Spread of the Körös Culture. *Atti Soc Preist*. 2010;17:101–155.
24. Domboróczki L. The Füzesabony-Gubakút Settlement Development Model. In: Hamon C, et al., editors. The Domestic Space in LBK Settlements, VML Verlag Marie Leidorf GmbH, Germany; 2013. p. 183–200.
25. Bogucki P. Forest Farmers and Stockherders. Early Agriculture and its Consequences in North-Central Europe. Cambridge University Press, USA; 1988. p. 247.
26. Gronenborn D. Comparing Contact-Period Archaeologies: The Expansion of Farming and Pastoralist Societies to Continental Europe and to Southern Africa. *Liverpool University Press Online*. 2004;2004(4):1–35.
27. Kosse K. Settlement Ecology of the Early and Middle Neolithic Körös and Linear Pottery Cultures in Hungary. BAR Publishing: UK; 1979;S64.
28. Perlès C. The First Farming Communities in Europe. The Early Neolithic in Greece, University Press Cambridge, USA; 2001. p. 344.
29. Keerl V. A River Runs Through It. Ancient DNA Data on the Neolithic Populations of the Great Hungarian Plain. Phd Dissertation, Johannes Gutenberg Universität Mainz, Germany; 2014. p. 210.
30. Shennan S. Evolutionary Demography and the Population History of the European Early Neolithic. *Hum*. 2009;81(1–2):339–355.
31. Zimmermann A. Landschaftsarchäologie I: Die Bandkeramik Auf Der Aldenhovener Platte. *Brgk*. 2003;83(2002):17–38.
32. Marton T, Oross K. Siedlungsforschung in Linienbandkeramischen Fundorten in Zentral Und Südtransdanubien Wiege, Peripherie Oder Beides? In: Smolnik R, editors. Arbeits- Und Forschungsberichte Zur Sächsischen Bodendenkmalpflege, Hungary; 2012. p. 220–239.
33. Virág M. The Eastern Periphery of the Central European LPC in the Region of Budapest. (Connections between the Transdanubian LPC and the Alföld). In: Kozłowski JK, editor. *Interactions between Different Models of Neolithization North of the Central European Agro-Ecological Barrier*. Polska Akademia Umiejętności, Poland; 2009. p. 9–30.
34. Domboróczki L, Budek A, Szabó DL, et al. Excavation along the Easternmost Frontier of the Lbk in Ne-Hungary At Apc-Berekalja I (2008-2009). *Archaeologiai Értesítő*. 2016;141:1–27.
35. Oross K. Oross Balatonszárszó-Kis-Erdei-Dűlő Lelőhely Középső Neolit Településszerkezete És Közép-Európai Párhuzamai. Phd Dissertation, Hungary; 2013. p. 455.


**Citation:** Domboróczki L, Kalli A, Makoldi M, et al. The füzesabony-gubakút settlement development model of the alföld linear pottery culture in the light of the recent archaeological discoveries at hejőpapi-szeméttelep (2008-2011) and bükkábrány-bánya vii -vasúti dűlő (2009-2011). *J His Arch & Anthropol Sci.* 2017;2(2):31–43. DOI: 10.15406/jhaas.2017.02.00046

36. Rück O. Neue Aspekte Und Modelle In Der Siedlungsforschung Zur Bandkeramik. Die Siedlung Weisweiler 111 Auf Der Aldenhovener Platte, Verlag Marie Leidorf Gmbh, Germany; 2007. p. 318.

37. Pavlů I, Rulf J, Zápotocká M. Theses on the Neolithic Site of Bylany. *Pam Archeol Lxxvii*. 1986;288–412.

38. Lüning J. Forschungen Zur Bandkeramischen Besiedlung Der Aldenhovener Platte. Siedlungen Der Kultur Mit Linearkeramik in Europa. Internationales Kolloquium Nové Vozokany, *Slovakia*. 1982. p. 125–156.

39. Lüning J. Frühe Bauern in Mitteleuropa Im 6 Und 5. *Jahrtausend V Chr Jahrbuch Des Rgzm*. 1991;35(1):27–93.

40. Stehli P. Zur Methode Der Chronologischen Gliederung Des Bandkeramischen Siedlungsplatzes Langweiler 8. Siedlungen Der Kultur Mit Linearkeramik in Europa. *Internationales Kolloquium Nové Vozokany*. Slovakia; 1982. p. 271–277.

41. Moddermann PJR. Die Bandkeramik Im Graetheidegebiet. Niederlandisch. *Limburg Brgk*. 1985;66:26–121.

42. Rück O. From Yard to House Row: The Bandkeramik Village - Layouts In Rows And Feature-Free Areas Provide A New View On Settlement Structure. In: Hamon C, et al., editor. The Domestic Space in LBK Settlements, Verlag Marie Leidorf Gmbh, 2013. p. 201–230.

43. Csányi M, Tárnoki J. A Dinner Set from a Bronze Age House in Level 2 of the Túrkeve-Terehalom Settlement. In: Anders A & Kulcsár G, editors. Moments in Time, Eötvös Loránd University, Hungary; 2013. p. 707–723.

44. Gronenborn D. Climate Fluctuations and Trajectories to Complexity in the Neolithic: Towards a Theory. *Documenta Praehistorica*. 2009;36:97–110.

45. Strien HC, Gronenborn D. Klima- Und Kulturwandel Während Des Mitteleuropäischen Altneolithikums (58./57. 51./50. Jahrhundert V. Chr.). Klimaveränderung Und Kulturwandel in Neolithischen Gesellschaften Mitteleuropas, Hungary; 2005. p. 131–149.

46. Schmidt B, Gruhle W, Rück O, et al. Zur Dauerhatfigkeit Bandkeramischer Häuser Im Rheinland (5300-4950 V. Chr.) Verlag des Römisch-Germanischen Zentralmuseums, Germany; 2005. p. 151–170.

47. Petrasch J. Seid Fruchtbar Und Mehret Euch Die Erde Und Machet Sie Euch Untertan. Überlegungen Zur Demographischen Situation Der Bandkeramischen Landnahme. *Archäologisches Korrespondenzblatt*. 2001;31:13–25.

48. Appel BJP. Neolithic Demographic Transition, Population Pressure and Cultural Change. *Comparative Civilizations Review*. 2008;58(6):36–49.

49. Bandy. Global Patterns of Early Village Development. In: Appel BJP, Yosef BO, editors. The Neolithic Demographic Transition and its Consequences, Springer, Germany; 2008. p. 333–357.

50. Selján É, Veres J. Újabb Lelőhelyek Az Alföldi Vonaldíszes Kerámia Kultúrájának Korai Időszakából Borsod-Abaúj-Zemplén Megyében. *Annales Musei Miskolciensis De Herman Ottó Nominati*. Hungary; 2008. p. 5–28.

51. Videiko M. Trypillia Culture Proto-Cities: After 40 Years of Investigations. *Trypillian Civilization Journal*; 2011;1–12.

52. Kalli A, Tutkovics E. Előzetes Jelentés A Bükkábrány-Vasúti- Dűlő Vii. Lelőhely Régészeti Feltárásairól, Régészeti Kutatások Magyarországon, Hungary; 2015.

**Citation:** Domboróczki L, Kalli A, Makoldi M, et al. The füzesabony-gubakút settlement development model of the alföld linear pottery culture in the light of the recent archaeological discoveries at hejőpapi-szeméttelep (2008-2011) and bükkábrány-bánya vii -vasúti dűlő (2009-2011). *J His Arch & Anthropol Sci.* 2017;2(2):31–43. DOI: 10.15406/jhaas.2017.02.00046